

boundaries of the representation of said reflective element in each frame of said video image data from a single said video recording device, thereby determining said absolute linear and angular motion measurements of said light reflective element relative to said reference datum.

27. The analysis tool as defined in claim 21 further comprising a means to calculate secondary motion data from said absolute linear and angular motion measurements of said light reflective element relative to said reference datum. This said secondary motion data is comprised of stroke tempo, back stroke distance, follow through distance, off-line distance, and variance from ideal path.

## REMARKS

### **General**

Applicant has rewritten all claims to better define the invention more clearly and define the patentability over the cited prior art.

**Claims 1-2 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nesbit et al. (5772522) in view of Taggett (6254492).**

Claims 1-2 and 6-10 have been omitted or rewritten as new claims 21 - 27 to define patentability over the above cited references, and any combination thereof. Applicant requests reconsideration of this rejection, as now applicable to the rewritten claims 21 - 27 for the following reasons:

#### Claim1:

Although Nesbit and Taggett do teach the use of video recording devices, a computer processing environment, a light reflective element, means for processing the recorded video images, a display device, and means for calibration, these elements are used in a different combination and for a significantly different purpose as compared to the present invention. There is no justification in Nesbit and Taggett which suggests that these references are or can be combined or used in the manner proposed by the current invention.

1. The light reflective marker taught by Nesbit is used for detecting the motion of the golfer or golf club that, in turn, drives a kinetic computer visual simulation. The detection of the reflective

markers as taught by Nesbit does not provide absolute position, velocity, or angular measurements but instead, provides only simulated movement; no absolute measurements can be taken or displayed. The marker, in conjunction with the analysis performed by the current invention, provides absolute measurements of position and angle with respect to time. The use of a reflective marker in combination with the other elements of the present invention to measure absolute position and motion is not suggested by Nesbit or Taggett.

2. The calibration marker taught by Taggett is used to position a video camera in the proper position. The means for calibration of the present invention is not a means for accurately positioning a camera but, instead, a means for correcting analysis measurements by compensating for camera misalignment and distortion after the camera is positioned. Whereby the calibration method taught by Taggett helps with correct camera placement before recording, the calibration of the current invention automatically measures camera position and distortion errors and makes compensations during recorded image processing.

Furthermore, the calibration method of the current invention measures and compensates for distortion cause by the optical lenses of the camera. This feature of the calibration method of the current invention is novel and not taught by Taggett.

The cited references, separately or combined, are inoperative with regards to measuring motion or calibration as described by the current invention. In fact, the references cited teach away the methods of calibration and measurement by the current invention. Claim 1 has been rewritten as new claim 21 to clarify these important distinctions which makes it patentable over these references.

Claim 2:

Taggett teaches the use of an external sensor to automatically start the video camera recording action (...The video "snapshot" taken by the video camera (3) which is triggered by sensor array (20) captures a still image of the club head...). In the current invention, certain specific characteristics of the images recorded by a single video camera used to measure subject motion are also used to determine when to start the analysis process (no external device or additional camera). Furthermore, Taggett makes no mention of any analysis processes that are started automatically as a result of specific video image conditions. Claim 2 has been rewritten as new claim 22 to clarify these important distinctions which makes it patentable over these references.

Claims 6-8:

The applicant agrees with The Examiner that Claims 6 - 8 are obvious to one with ordinary skill in the art based on the cited references and are not included in the amended application.

Claims 9-10:

Claims 9 - 10 are not included in the amended application.

**Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nesbit et al. (5772522) in view of Taggett (6254492) in further view of Terry, III et al. (5527041).**

Claim 3 has been rewritten as new claim 23 to define patentability over the above cited references, and any combination thereof. Applicant requests reconsideration of this rejection, as now applicable to the rewritten claims 23 for the following reasons:

1. Even if combined, the cited references could not achieve the feature claimed by the present invention. The laser device and guide rails taught by Terry display a straight line from a starting location to the target and act to provide a physical guide for a moving putter, not a golf ball. The guide portion of the calibration fixture of the current invention is a physical edge that guides a moving ball such that the ideal ball trajectory can be experimentally determined. All combinations of the cited references are unable to physically guide a moving golf ball. In the current invention, after the ideal trajectory of the ball is determined using the calibration fixture (iterative process of changing its position until the ball reaches the target hole), the visual calibration target is then aligned to the calibration fixture. A recorded image of the calibration target is processed to align the entire analysis tool to this ideal ball trajectory such that it can be used as a datum reference by the analysis tool. This approach is novel and not suggested by any combination of cited references.

The calibration fixture of the current invention is patentable over the cited references and other prior art in the fact that it permits the analysis tool to be aligned to the ideal trajectory the ball must take to reach the target hole, not the straight line to the target hole as taught by Terry. Because of undulations (grade changes) of a typical putting surface, it is very rare that the ideal ball trajectory is a straight line from the starting point to the target. It is this key feature that permits the analysis system to be precisely aligned to a relevant reference datum and is therefore

patentable over prior art. Claim 3 has been rewritten as new claim 23 to clarify these important distinctions which makes it patentable over these references.

**Claims 11 and 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nesbit et al. (5772522) in view of Taggett (6254492) in further view of Gobush et al. (20030103684).**

Claims 11 and 14:

Claims 11 and 14 have been removed from the application. The novel elements claimed in claim 11 and 14 have been combined with the new claim 21 to define patentability over the above cited references, and any combination thereof. Applicant requests reconsideration of this rejection, as now applicable to the rewritten claim 21.

Claim 15:

Claim 15 has been rewritten as new claim 26 to define patentability over the above cited references, and any combination thereof. Applicant requests reconsideration of this rejection, as now applicable to the rewritten claims 26 for the following reasons:

Nesbit teaches the use of solid modeling algorithms to approximate actual subject motion using a kinematics model and assumed parameters for purposes of displaying a visual android representation. Nesbitt, with any combination of cited references or prior art, does not disclose or suggest a digital imaging processing algorithm that finds the center location and edges of the reflective marker in the recorded video images, as does the current invention. Nesbitt's solid model approximates the relative relationship between the reflective markers for visual representation purposes but does not measure the center and edge position of any individual marker. The algorithm of the present invention does accurately find the center and edge of any single reflective marker for purposes of determining the absolute position and angle of the marker with respect to a reference datum and therefore to the putter to which it is attached..

There is no justification in Nesbit in combination with other cited references which suggests that these references are combined or used in the manner proposed by the current invention.

Claim 16:

Claim 16 has been rewritten as new claim 27 to define patentability over the above cited references, and any combination thereof. Applicant requests reconsideration of this rejection, as now applicable to the rewritten claims 27 for the following reasons:

1. Nesbit in combination with Gobush teaches the use of solid modeling algorithms to approximate actual subject motion using a kinematics model and assumed parameters for purposes of displaying a visual android representation. Any secondary measurements derived from this solid modeling algorithm are based on approximate positions of any individual marker and model parameter assumptions, not the actual absolute position and angle of any individual marker. The present invention claims secondary measurements that can only be calculated using absolute position and angular measurements of individual markers.
2. Gobush teaches a complex method of using several cameras (more than one is required) to measure the relative motion of a moving golf ball to determine spin rate and other secondary measurements. The method of calculating secondary measurements of the current invention requires measurements of the putter head, not the ball, and can be done with the use of only a single video camera.

The cited references, separately or combined, are inoperative with regards to measuring motion and the calculation of secondary motion data based on those primary measurements as described by the current invention. In fact, the references cited teach away the novel methods of video image processing and measurement employed by the current invention.

Claims 17 - 20:

The applicant agrees with The Examiner that Claims 17 - 20 are obvious to one with ordinary skill in the art based on the cited references and are not included in the amended application.

**Claims 4-5 and 12-13 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

Claims 4-5 and 12-13:

Claims 4-5 and 12-13 have been incorporated into the new claims 21 – 27.

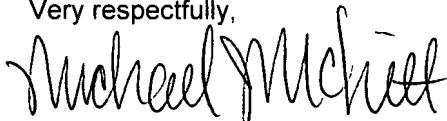
**CONCLUSION**

For all of the above reasons, the applicant submits the new claims all define patentability over the prior art. Therefore, the applicant submits that this application is now in condition for allowance, which action he respectfully solicits. The invention claimed herein has been in commercial production for four years and distributed under the brand name "V1-Putt". Please see [www.v1putt.com](http://www.v1putt.com) for reference.

**CONDITIONAL REQUEST FOR CONSTRUCTIVE ASSISTANCE**

The applicant has amended the claims of this application so they are proper, definite, and define novel structure which is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, the applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P 2173.02 and 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,



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**Certification of Mailing.** I hereby certify that this correspondence, and attachments, if any, will be deposited with the United States Postal Service by First Class Mail, postage pre-paid, in an envelope addressed to "Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" on the date below.

2007 May 02



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